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Andrew Holmes

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EXAMINER

YAMNITZKY, MARIE ROSE

ART UNIT

PAPER NUMBER

1794

MAIL DATE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/511,954	Applicant(s) HOLMES ET AL.	
	Examiner Marie R. Yamnitzky	Art Unit 1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 Oct 2004, 21 Jan 2005 and 08 Jan 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 32-97 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 32-97 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>18 Oct 2004, 21 Jan 2005</u> . | 6) <input type="checkbox"/> Other: _____ |

1. The preliminary amendment filed October 18, 2004, which amends the abstract, the specification and claims 1, 3-8, 10-21, 24, 26-30, cancels claims 22 and 23, and adds claim 31, has been entered.

The preliminary amendment filed January 21, 2005, which cancels claims 1-21 and 24-31, and adds claims 32-74, has been entered.

The preliminary amendment filed January 08, 2008, which adds claims 75-97, has been entered.

Claims 32-97 are pending.

2. The disclosure is objected to because of the following informalities:

The synthetic routes set forth in the second paragraph of page 22 of the specification include text/symbols that are illegible.

Appropriate correction is required.

3. Claims 74 and 97 are objected to under 37 CFR 1.75(c) as being in improper form because a multiple dependent claim should refer to other claims in the alternative only. See MPEP § 608.01(n).

This objection could be overcome by amending the last line of claim 74 to read “injecting layers for generating light and comprising said material.” and by amending the last line of claim 97 to read “layers for generating light and comprising said material.”

Art Unit: 1794

4. Claims 76, 77, 81 and 87-90 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The limitations of claims 76, 77 and 81 are not clear. While the preamble of claim 75, from which claims 76, 77 and 81 depend, refers to a material comprising an organometallic group, the only positive recitation of an organometallic group in the process steps set forth in claim 75 is in reference to the end-capping reagent used in step (b). It is not clear if the organometallic group referenced in claims 76, 77 and 81 is the organometallic group of the end-capping reagent, or is in addition to the organometallic group of the end-capping reagent.

The limitations of claims 87-90 are not clear because the term “substantially” is relative. The scope of “substantially” conjugated as recited in claim 87, with claims 88-90 dependent directly or indirectly therefrom, is not clear.

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 32-97 are rejected under 35 U.S.C. 102(e) as being anticipated by Ikehira et al. (US 2002/0193532 A1).

See the entire patent application publication. The limitations of present claims 32-97 are taught throughout the publication. In particular, see paragraphs [0007]-[0019], [0032], [0035]-[0061], [0065]-[0075], [0078]-[0088], [0093]-[0121], [0127], [0129]-[0136], [0142]-[0160], [0174]-[0203], [0223] and [0268]-[0284].

With respect to present claim 32 and dependents, Ikehira et al. teach that Suzuki polymerization may be used to produce a material as described in lines 3-7 of claim 32. In particular, see paragraphs [0017], [0114]-[0115], [0120]-[0121], [0127], [0130]-[0136] and [0139]-[0140]. Although Ikehira et al. do not provide a specific example in which Suzuki polymerization is used to produce such a material, the process steps of claim 32 and dependents, and the characteristics of the polymer produced per claim 32 and dependents, are taught in the prior art.

The polymers produced per Ikehira's Examples 3, 4 and 5 are polymers having the characteristics recited in lines 3-7 of claim 32, and the reaction mixture includes monomers within the scope of present formula (V), but the polymers are made using a Ni(0) catalyst instead of by Suzuki polymerization. The polymers produced per Ikehira's Examples 3, 4 and 5 meet the limitations of a polymer resulting from the process of present claims 32-40 and 45. Ikehira et al. teach Suzuki polymerization as a suitable alternative to polymerization using a Ni(0) catalyst. One of ordinary skill in the art at the time of the invention would have at once envisaged the corresponding monomers and polymerization steps necessary to produce the same and similar polymers utilizing Suzuki polymerization. Further, given Ikehira's teachings such as in paragraphs [0130]-[0131] and the examples of metal complex structures and various repeating

Art Unit: 1794

unit structures provided in Ikehira's disclosure, one of ordinary skill in the art at the time of the invention would have at once envisaged many other monomers of present formula (IV) or (V) to be used to make polymers by Suzuki polymerization according to Ikehira's disclosure.

With respect to present claim 41, one of ordinary skill in the art at the time of the invention would have at once envisaged monomers having general formula V based on Ikehira's teachings. For example, given Ikehira's teachings in paragraphs [0087]-[0088] of a ligand of formula (7) in which at least one of R^3 to R^{10} is a bonding group to a polymer chain, and given Ikehira's teachings in paragraphs [0130]-[0131], one of ordinary skill in the art at the time of the invention would have at once envisaged organometallic monomers in which two of R^3 to R^{10} of a ligand of formula (7) are reactive groups as required for Suzuki polymerization.

With respect to present claims 42-44, given Ikehira's teachings such as in paragraphs [0044] and [0131]-[0132], one of ordinary skill in the art at the time of the invention would have at once envisaged monomers having general formula IV wherein the organometallic group includes a carbon metal bond as in claim 42, and would have at once envisaged polymers made according to the process of claims 43 and 44.

With respect to present claim 46, see paragraph [0037] for example. Ikehira's teaching of "methylene group, alkylene group" in paragraph [0037] anticipates a non-conjugated spacer group.

With respect to present claims 47-50, Ikehira's polymers, which can be made by Suzuki polymerization using monomers as required by present claim 32 as previously noted, are taught for use in the light-emissive layer of a polymer LED. The polymer LED is an optical device and

has the layered structure set forth in claim 50. The polymer can be deposited by solution-processing as required by claim 48. For example, see paragraphs [0175]-[0176] and [0223].

With respect to present claims 51-57, given Ikehira's teachings such as in paragraph [0044] and [0131]-[0132], one of ordinary skill in the art at the time of the invention would have at once envisaged monomers having general formula IV wherein the organometallic group includes a carbon metal bond as in claim 51 with claims 52-55 and 57 dependent therefrom. One of ordinary skill in the art at the time of the invention also would have at once envisaged similar monomers having a non-conjugated spacer group per claim 56 given Ikehira's teaching of "methylene group, alkylene group" in paragraph [0037]. One of ordinary skill in the art at the time of the invention also would have at once envisaged monomers having general formula V as in claim 51 with claims 52-54 dependent therefrom based on Ikehira's teachings. For example, given Ikehira's teachings in paragraphs [0087]-[0088] of a ligand of formula (7) in which at least one of R^3 to R^{10} is a bonding group to a polymer chain, and given Ikehira's teachings in paragraphs [0130]-[0131], one of ordinary skill in the art at the time of the invention would have at once envisaged organometallic monomers in which two of R^3 to R^{10} of a ligand of formula (7) are reactive groups such as present X and X'.

With respect to present claims 58-74, all the limitations recited in these claims are taught by Ikehira et al. in one or more of the previously referenced paragraphs. Polymers having an organometallic group pendent from the backbone wherein a non-conjugated spacer group separates the organometallic group from the backbone are taught, for example, in paragraph [0037] which teaches a divalent group such as "methylene group, alkylene group".

With respect to present claims 75-85, all the limitations recited in these claims are taught by Ikehira et al. in one or more of the previously referenced paragraphs. Reaction of monomers per step (a) of claim 75 is taught, for example, in paragraphs [0115], [0120] and [0130]-[0131]. Termination using an end-capping reagent containing an organometallic group is taught in paragraph [0047], and one of ordinary skill in the art at the time of the invention would have at once envisaged an end-capping reagent as required by step (b) of claim 75 for Suzuki polymerization.

With respect to present claims 86-97, the polymers produced per Ikehira's Examples 3, 4 and 5 meet the limitations of a material according to claims 86-94, and the polymer LED of Ikehira's Example 6 meets the limitations of claims 95-97. Various other polymers within the scope of claims 86-94, and devices or components therefor within the scope of claims 95-97, would have been at once envisaged by one of ordinary skill in the art at the time of the invention given Ikehira's teachings.

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 32-97 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikehira et al. (US 2002/0193532 A1) as applied to claims 32-97 above, and for the further reasons set forth below.

The present claims cover a broad range of monomers, processes utilizing those monomers, and products made from the monomers. Ikehira et al. teach the limitations of the present claims, and various monomers, processes and products within the scope of the present claims are either explicitly disclosed, or would have been at once envisaged by one of ordinary skill in the art at the time of the invention given Ikehira's disclosure.

Further, given Ikehira's disclosure as a whole, it would have been *prima facie* obvious to one of ordinary skill in the art at the time of the invention to make various polymeric light emitting substances comprising combinations of repeating units selected from those that are taught or suggested by Ikehira et al. in order to provide a variety of polymeric light emitting substances within Ikehira's guidelines. Given Ikehira's teaching of Suzuki polymerization as a method which can be used to provide Ikehira's polymers, it would have been *prima facie* obvious to utilize monomers having reactive groups suitable for Suzuki polymerization in order to make various polymeric light emitting substances comprising combinations of repeating units selected from those that are taught or suggested by Ikehira et al. in order to provide a variety of polymeric light emitting substances within Ikehira's guidelines.

9. Applicant is advised that should claim 32 be found allowable, claims 47 and 49 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof.

Applicant is advised that should claim 75 be found allowable, claims 76, 77 and 81 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof.

When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

In the case of claims 32, 47 and 49, the only positively recited process step for the process of claims 47 and 49 is the step of preparing a material capable of luminescence according to the process of claim 32. Accordingly, the process steps of the process of claim 32 and the process steps of the method of claims 47 and 49 are the same.

In the case of claims 75-77 and 81, presuming that “the organometallic group” referenced in claims 76, 77 and 81 is the organometallic group of the end-capping reagent as recited in claim 75, then claims 76, 77 and 81 are of the same scope as claim 75 since the organometallic group of the end-capping reagent will necessarily be pendent from, and a part of the backbone of, the polymer or oligomer, and will necessarily be conjugatively bound to the polymer or oligomer.

10. Miscellaneous:

In the last line of claim 32, and in the fourth line from the end of claim 51, “ $p \geq 0$ ” should read “ $p \geq 0$ ”.

Art Unit: 1794

In the penultimate line of claim 65, the symbol “ \geq ” should be separated from the number following each occurrence of the symbol.

11. Any inquiry concerning this communication should be directed to Marie R. Yamnitzky at telephone number (571) 272-1531. The examiner works a flexible schedule but can generally be reached at this number from 7:00 a.m. to 3:30 p.m. Monday-Friday.

The current fax number for all official faxes is (571) 273-8300. (Unofficial faxes to be sent directly to examiner Yamnitzky can be sent to (571) 273-1531.)

/Marie R. Yamnitzky/
Primary Examiner, Art Unit 1794

MRY
September 02, 2008